EUROPE'S ARCHITECTURAL IDENTITY
A Visualisation Method of Ideas

Dominik Lengyel
BTU Brandenburgische Technische Universität Cottbus-Senftenberg / BTU Brandenburg University of Technology Cottbus-Senftenberg, Cottbus, Germany

Catherine Toulouse
Lengyel Toulouse Architekten / Lengyel Toulouse Architects, Berlin, Germany

Abstract

Europe is also architecture. When Jacques Derrida counts philosophy, democracy and the Enlightenment, architecture is an essential gap. There is a number of artistic expressions, but amongst them architecture, as the space that we live in, plays an exposed role. Architecture is a criterion, a tradition that truly belongs to Europe. A debate on the architectural artistic representation of Europe from the past to the future will consolidate a place for Europe in the world. And this place does not, at least not in the principal sense, yield to the imperialist tradition. On the contrary, Europe's architecture consists mainly of civilian or clerical buildings. Built architecture though is subject to its deterioration, while the intellectual achievement of architectural projecting and design are what will be left of Europe's history. Architectural ideas are almost timeless as they always negotiate ourselves in our environment. But ideas are rarely acknowledged as deserved. In most cases, architecture that does not meet today's needs is considered as part of building archaeology. But there is much more in historic architecture, a wealth of inspirations. Architecture has always been more than buildings. This artistic surplus needs to be exposed, to be presented as a timeless intellectual achievement that goes far beyond its original historical intention. For this we have developed a method that visualizes architectonic ideas. The presentation aims to demonstrate and illustrate this method by several projects developed by the authors in cooperation with archaeological research institutions like Cologne Cathedral and its Predecessors (by order of and exhibited in Cologne Cathedral), The Metropolis of Pergamon (within the German Research Fund Excellence Cluster TOPOI, actually exhibited in Leipzig as part of Sharing Heritage, the European Cultural Heritage Year 2018), The Palatine Palaces (by order of the German Archaeological Institute, both latter exhibited in the Pergamon Museum Berlin).

Keywords: Architecture, Design, Visualisation, Uncertainty, Knowledge

Introduction

Europe is – among a large number of artistic expressions – also architecture, the space that we live in. But built architecture is subject to its deterioration, while the intellectual achievement of architectural projecting and design are eternal. Architectural ideas are almost timeless as they always negotiate ourselves in our environment. But ideas are rarely acknowledged as they deserve. In most cases, architecture that does not meet today's needs is considered only as a matter of building archaeology. But there is much more in historic architecture, a wealth of inspirations. Architecture has always been more than buildings. This artistic surplus needs to be exposed, to be presented as a timeless intellectual achievement, that goes far beyond its original historical intention. This leads to a shift in perception. Apart from architecture that has been built or is even still standing, there is also architecture that has only been conceived. This is of course a matter of hypotheses as only built architecture is certain. Still, in its uncertainty, hypothetic architecture can consist of qualities that persist over time, that is apart from construction and material mainly a matter of composition, proportion and rhythm. Based on hypotheses by building historians and archaeologists, we established a method for visualising architectural ideas and concepts as if they had been built.

Visualizing ideas

To solve this ostensive dilemma of hypotheses versus vividness, for architectural topoi we have developed a method that explicitly respects the scientific content and still offers an immersive spatial impression. Contrasting the geometric abstraction of the model, that is strictly based on the verbal hypotheses, our way of visualising hypotheses uses, transforms and rearranges traditional methods of realistic architectural photography. By this reference on visual traditions our images enable their recipients to immediately engage with the content, as both archaeology and architecture have always dealt with and visually mediated spatial.

In archaeology, knowledge does not only contain what we call certain knowledge, but also what we call uncertain knowledge. Uncertain knowledge ranges from interpolated findings to even contradictory hypotheses. In general, visualisations are regarded as reconstructions, neglecting the lack of knowledge in favour of speculative additions. This approach is widely use in the games and film industry. Visualizing uncertainty on the contrary necessarily leads to abstraction.

There is a common understanding of the meaning of the terms “uncertainty, knowledge and hypotheses” while the term “uncertain knowledge” seems to be contradictory at first. Also, the expression “design of abstraction” seems ambiguous since design usually describes the concrete shaping of forms while abstraction is rather a matter of the fine arts.

If archaeological hypotheses are transformed into abstract forms up to the archaeologists’ accordance, the design of abstracion creates images of architectural ideas without adding more to the hypotheses than necessary.

The expression “uncertain knowledge” underlines the wide range in the midst of knowledge and lack of knowledge by pointing out the states of knowledge in between. It takes into account incomplete knowledge, e. g. if some parts of a structure are known while other parts are unknown, but also contradictory knowledge, that is if the deduction of prerequisites allows contradictory yet equivalent conclusions. Incomplete and contradictory knowledge is then summarized as uncertain knowledge.

The major task is architectonic design. This design is performed in two steps. The first step is the creation of abstract representations of the hypothetical architectonic entities in different scales from buildings via building parts to ornamental details. Every single element undergoes an individual design process until the cooperating scientist attest at least a state that we call free from contradiction. The second, complementary step is the projection of the model, the depiction, or the “virtual photography” as we call it according to its intention and importance. It means, that the abstract geometry is treated as if the

architecture and the photographer were real, and it underlines the importance of the photographic design in the visualisation of hypotheses.

Both tasks are not trivial as they cannot be fully formalized. Their intention can be described, and there are a number of targets that can be achieved accordingly. But there is still a critical need for design, the search for a formal composition, a synthesis of diverging necessaries.

The presented work focuses on architectonic structure. There is a number of aspects that are not represented, such as the use of space. But this emphasis enables the visualisation to focus not only on the hypothetic structure itself but also to open its interpretation towards a general understanding of architectonic space, apart from its historical procedural and habitual meaning. Urban space, spatial relations in general or the recontextualization of sculptures may be interpreted as architecture, apt to be transferred onto today's perception and planning processes. Impressive building like Cathedrals have a strong visual, spatial and social impact independent from their religious context and the religious attitude of their visitors. The focus on the architectural structure reveals more of architecture than a realistic simulation. The transition from architecture to its structure is primarily a matter of abstraction.

Abstraction is the traditional way of choice for visually expressing ideas but also interpretations, that is in particular fictional designs or scientific hypotheses. Abstraction is often used in multiple degrees simultaneously, that is, while some parts are defined at a high level, others are left less defined or even undefined. In this way spatial abstraction is similar to sketch drawing. In sketches certain aspects are emphasized while others are left away. Sketches depict an idea rather than a realistic vision.

Physical modelling works similarly, in particular historic architectural plaster models have always focused on geometry. Materiality but also many other aspects are left away, in favour of the better understanding of the architectonic structure and shape. Just as in drawings, abstract models define structural ideas and leave details undefined. Abstraction does not pursue imitation or simulation, but explanation and argumentation. Abstract representations are capable to

mediate hypotheses as well as knowledge, and this among scientists as well as towards the general public. Of course, the public has to be willing to deal with abstraction in general as if going to a contemporary art exhibition.

The commitment to stay as close to the scientific hypothesis as possible while at the same time to provide an immersive vision seems to be a dilemma at the first glance. Indeed abstraction and attraction do complement each other, if the design of abstraction is performed on design, architecture and photography simultaneously.

The visualisation of ideas continues the works of abstract architecture and the tradition of architectural model work and defines a range of methods for designing abstraction. It concerns two reciprocal transformatory processes from the original hypothesis to the mediating visualisation, that is the shape and its projection, that we call virtual photography as we take the abstract geometry as if it was built architecture. Both aspects are described as references to traditional architectural modeling respectively traditional architectural photography.

Geometric simplification is the most intuitive way to represent uncertainty. In circumstances other than archaeology abstract forms may be misinterpreted as contemporary design, but in the archaeological context this should not happen. Geometric contrasts demonstrate the different degrees of certainty, that is when findings and hypotheses are shown directly next to each other. Here also it is the context of archaeology that excludes a misinterpretation as a contemporary architectural design sketch. Transparency on the contrary as a solution of representing an uncertain object does not help mediating its spatial impact, since transparency suppresses and distorts the natural spatial impression.

If there are contradictory hypotheses, it is impossible to maintain the spatial qualities and the ambiguity at the same time. In this case the hypotheses should be presented separated next to each other, so it is clear, that all hypotheses are equally significant. Transparent objects represent neither of the two possible spatial solutions that is being there or not being there. Instead of visualizing two options, transparency visualizes neither of them, but represents the uncertainty

in a non-spatial, but schematic way. Only solid objects ensure that if a shape is part of the visualization, it will also be perceived as an object. Transparencies contradict this and hinder the understanding of a spatial situation. The spatial representation then would not focus on spatial perception, but on abstract information, just as the verbal hypothesis does. This way *la raison d'être* of a visualisation, that is serving as a supplement for the verbal description of the hypotheses, is undermined.

The proximity of a visualisation to its verbal hypothesis is indispensable for their acting as mediators of science. This influences, among others, the decision of black and white or coloured images. As colours always win over geometry, in cases where the certainty in knowledge concerning the geometry outstands the knowledge about the singles colours, monochromatic representations mediate a certainty far higher than a polychromatic image would. Colour is decisive, that is, an image can only be monochromatic or polychromatic, there is not any way in between. If objects whose colour is undoubtedly known – like a blue sky – were shown in colour, in this example blue, the image would inherit a new dimension that is the colour dimension. Immediately every gray surface would also represent this new dimension and transport the information of being gray. In other words, the blue sky would paint the buildings white. Only a black and white photography leaves the buildings' colours completely unmentioned. Only if the knowledge suffices, colours may be applied (Hardering 2016).

The proximity to the hypotheses also concerns the need for a photography that despite its design and composition aims at a projection that does not distort the geometry but makes it unambiguous and reliable to ensure its appropriate interpretation. Unambiguity in eye level means a clear distinction of human eye level or bird's eye view. Unambiguity in tilt means either a horizonal view direction – leading to a vertical image plane that again leads to a vertical depiction of vertical building edges – or a clear tilt view used for example as a view into a steep spiral stair case.

The differentiation between the simulation of built architecture and visualised hypotheses or ideas make uncertain visualisations an issue of imagination and

creativity. The design of abstraction intuitively explains this by clearly demonstrating that the idea of architecture is created in the spectator's mind and imagination. Just as the design process requires creativity, visualisations of uncertainty – abstract ideas – also induce individual creativity at the recipients. But only as long as – and this is an important point to consider, since the design of abstraction is a substantive profession – the creational process of virtual modeling and virtual photography is performed professionally as qualified architectural design.

Major projects

The project of the metropolis of Pergamon (Fig. 1 and 2, by Lengyel and Toulouse, Laufer et al. 2011) including 3D Digital image acquisition for the re-contextualisation of 3D scanned sculptures in their hypothetical original architectonic context was funded by and elaborated in cooperation with the German Research Fund Excellence Cluster TOPOI. Its last monographic exhibition took place in Leipzig in 2018 as part of Sharing Heritage, the European Cultural Heritage Year 2018. Our visualisations are published in major scienfitic architectural works about Pergamon as well as in the main museum catalogue of the antique collection of the Pergamon Museum Berlin and in a survey of research in museums by the German Ministry of Culture and Science (Hauser et al. 2012).

Since 2008 scientists in archaeology and building archaeology work with the geometric accuracy of this first three-dimensional overall model of the metropolis. The model does not only evaluate spatial relations, it also reveals unforeseen visual phenomena. The re-contextualisation of antique sculptures furthermore allowed for the first time to visually present and prove the positioning of a number of antique sculptures that were exclusively scanned three-dimensionally for this project.

The project of the Palatine Palaces in Rome (Fig. 3 and 4, by Lengyel Toulouse Architects, Märtin & Wulf-Rheidt 2012) was funded by and elaborated in

cooperation with the German Archaeological Institute in Berlin and was first exhibited in the Pergamon Museum Berlin in the major exhibition of the Excellence Cluster TOPOI – a cluster lead by the Freie University Berlin, Humboldt University Berlin, German Archaeological Institute, Zuse Institute Berlin and others, funded by the German Science Foundation DFG – and in many other exhibitions since.

The project of Cologne Cathedral and its Predecessors (Fig. 5, by Lengyel Toulouse Architects, Lengyel et al. 2011) was funded by and elaborated in cooperation with the cathedral hut. It was first exhibited in the major annual archaeological exhibition of the federal state Nordrhein-Westfalen and has been exhibited in the entrance area of the archaeological zone in the cathedral since 2011. In 2012 an illustrated book enriched the film's information by plans and sections of the building phases and an explanatory text by the Cathedral architect of the time, Prof. Dr. Barbara Schock-Werner. On the occasion of the 150th anniversary of the Cathedral's choir ensemble, we also visualized the interior of the building's choir at its state around 1856, that is shortly before the demolition of the wall that separated the choir from the future nave (Hardering 2016). The visualisations have been used in other publications of other authors for illustrative purposes (Dietmar et al. 2011) as well as for questions of authenticity (Rheidt 2017). The diagrammatic character of the changes of the urban context of the churches lead to a dedicated treatise about diagrammatic architecture (Lengyel et al. 2013).

Figure 1. Bird's eye view of Pergamon around 200 AD

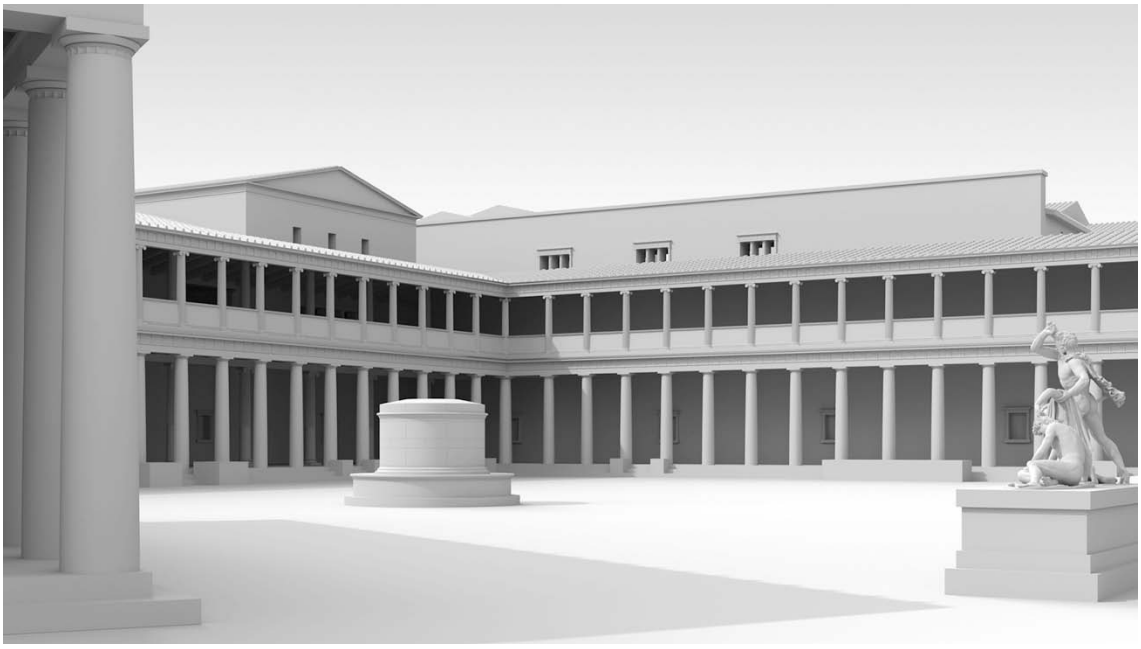

Figure 2. Sanctuary of Athena in Pergamon around 200 AD with Dying Gaul and Ludovisi Group on the right postament. In the back Palace V and on the left side the library building. At the front on the left some columns of the actual temple of Athena

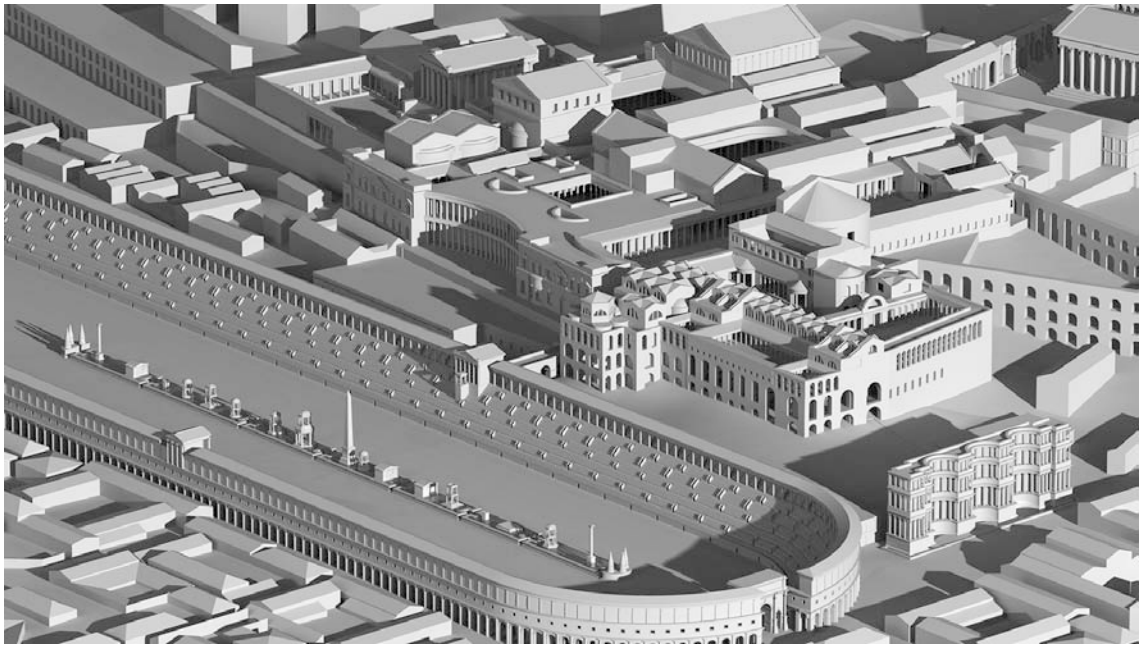

Figure 3. Bird's eye view of the Palatine Palaces in Rom under Emperor Maxentius

Figure 4. Courtyard in the Palatine Palaces in Rom under Emperor Maxentius

Figure 5. Cologne Cathedral around 1540 AD with its iconic construction crane

References

Dietmar, C. & Trier, M. (2011). *COLONIA - Stadt der Franken. Köln vom 5. bis 10. Jahrhundert*. Second edition. Köln: DuMont.

Hardering, K. (2016). Die Binnenchorausstattung des Kölner Domes im 19. Jahrhundert. In Müller-Oberhäuser, C. & Klösges, S. (eds), *Die Musikaliensammlung Leibl. Neukatalogisierung der Musikalien der Kölner Domkapelle des 19. Jahrhunderts*: 66-77. Köln: Erzbischöfliche Diözesan- und Dombibliothek.

Hauser, C. & Loch, M. (2012). *Museen. Forschung, die sich sehen lässt*. Bonn: BMBF, Referat Geistes-, Sozial- und Kulturwiss., Akad., Forschungsmuseen (Forschung).

Laufer, E. & Lengyel, D. & Pirson, F. & Stappmanns, V. & Toulouse, C. (2012). Die Wiederentstehung Pergamons als virtuelles Stadtmodell. In Grüßinger, R. & Kästner, V & Scholl, A. (eds), *Pergamon. Panorama der antiken Metropole*: 82-86. Petersberg: Michael Imhof Verlag.

Lengyel, D. & Schock-Werner, B. & Toulouse, C. (2011). *Die Bauphasen des Kölner Domes und seiner Vorgängerbauten. Cologne Cathedral and preceding buildings*. Köln: Verlag Kölner Dom.

Lengyel, D. & Toulouse, C. (2013). Die Bauphasen des Kölner Domes und seiner Vorgängerbauten. Gestaltung zwischen Architektur und Diagrammatik. In: Dietrich Boschung und Julian Jachmann (eds): *Diagrammatik der Architektur*. Paderborn: Fink (Morphomata, 6), S. 327–352.

Märtin, R.-P. & Wulf-Rheidt, U. (2012). Räume verwandeln. Der Palatin in Rom. In Excellence Cluster Topoi (eds), *Jenseits des Horizonts. Raum und Wissen in den Kulturen der Alten Welt*: 12-23. Stuttgart: Theiss.

Rheidt, K. (2017). Authentizität als Erklärungsmodell in der Baugeschichtsforschung. In: Christoph Bern-hardt, Martin Sabrow und Achim Saupe (eds): *Gebaute Geschichte. Historische Authentizität im Stadtraum*. Göttingen: Wallstein Verlag, S. 78–93.

Author identification

Dominik Lengyel. *Studied Architecture at the Universities of Stuttgart, Paris-Tolbiac and ETH Zürich. After working as architect at Prof. O. M. Ungers he founded an office for architectural visualisation with Catherine Toulouse. Teaching as first substitute and then regular professor at the University of Applied Sciences in Cologne. Chair for Architectural Representation as full professor at the BTU University Cottbus. Major research area is the visualisation of archaeological hypotheses. Associated and later regular member of the DFG research program Exzellenzcluster TOPOI. Since 2018 he is a member of the European Academy of Sciences and Arts in Salzburg*

Catherine Toulouse. *Catherine Toulouse studied Architecture at the Universities of Stuttgart, Paris-Tolbiac and ETH Zürich. After working as architect at Prof. O. M. Ungers from 1997 to 1998, she founded an office for architectural visualisation with Dominik Lengyel. From 2006 to 2018 she worked as assistant professor at the Brandenburg Technical University of Cottbus at the Chair for Architectural Representation. Her major research area is the visualisation of archaeological hypotheses. Since 2007 she is associated and since 2012 member of the research program Exzellenzcluster TOPOI*